Pin-Fuse Joint

I read with interest the article in the July *Modern Steel Construction* and the follow-up by C. Mark Saunders in September's *Steel Mail* column regarding the "pin-fuse joint" invented by Mark Sarkisian of SOM. Having completed two performance-based seismic designs using friction dampers, I concur with Mr. Sarkisian's assertion that building systems, if properly designed, tend to be self-restoring. How much self-restoration occurs depends on the damper slip forces, how much elastic energy is stored in the building, and how much "settling out" ground motion occurs following the main displacement event(s). Restoration would be difficult to predict without running some non-linear time-history analyses for a few typical earthquake records.

The pin-fuse joint seems like it would be pretty expensive to manufacture. You would have to save an awful lot of raw steel (via decreased member sizing) to pay for even one joint, since raw steel is still relatively inexpensive compared to labor costs. Because drift tends to control moment frame member sizes, as pointed out by Mr. Saunders, you would have to somehow justify a significant decrease in the deflection amplification factor (C_d) to pay for the joints.

The only way I can see the pin-fuse joint used to justify a lower C_d is through increased damping. I did not see any discussion of the increased damping that the joint might add to the system. Is it possible that the pin-fuse joint would result in significantly higher than five percent overall system damping?

I am sure the testing program will yield some interesting results, and I hope Mr. Sarkisian will publish at least a summary of the findings.

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